

# INEQUALITIES

BASIC RULE: IF YOU HAVE TO CROSS MULTIPLY / DIVIDE BY A NEGATIVE NUMBER, INEQUALITY SYMBOL WILL FLIP.

$$\begin{aligned} 1) \quad 3x - 7 &< 5 \\ 3x &< 5 + 7 \\ 3x &< 12 \\ x &< \frac{12}{3} \\ x &< 4 \end{aligned}$$

$$\begin{aligned} 2) \quad x - 7 &< 8 \\ x &< 7 + 8 \\ x &< 15 \end{aligned}$$

$$\begin{aligned} 3) \quad 2x &< 4 \\ x &< \frac{4}{2} \\ x &< 2 \end{aligned}$$

$$\begin{aligned} 4) \quad -2x &< 8 \\ x &> \frac{8}{-2} \\ x &> -4 \end{aligned}$$

$$\begin{aligned} 5) \quad \frac{x}{-3} &< 2 \\ x &> (2)(-3) \\ x &> -6 \end{aligned}$$

$$\begin{aligned} 6) \quad 12 - 2x &> 24 \\ -2x &> 24 - 12 \\ -2x &> 12 \\ x &< \frac{12}{-2} \\ x &< -6 \end{aligned}$$

$$\begin{aligned} 6 &> -3 \\ -6 &< 3 \end{aligned}$$

ADVANCED

1)

$$7 < 3x - 2 \leq 13$$

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$$3x - 2 \leq 13$$

$$7 + 2 < 3x$$

$$3x \leq 13 + 2$$

$$9 < 3x$$

$$3x \leq 15$$

$$\frac{9}{3} < x$$

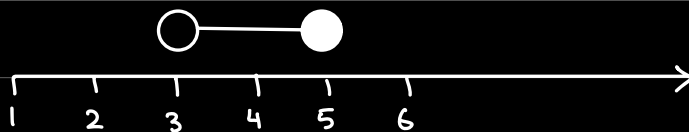
$$x \leq \frac{15}{3}$$

$$3 < x$$

$$x \leq 5$$

$$3 < x \leq 5$$

NUMBER LINE



write down all integers that satisfy this inequality:

No Decimal, No fraction.

~~3~~

4, 5

## SHADING INEQUALITIES

→ Requires coordinate geometry.

STEPS : 1) Find equation of all lines, make  $y$ -subject and label on graph.

2) Now decide  $>$  or  $<$  sign

above line means  $>$

below line means  $<$

Exception: For vertical line do not check above/below:

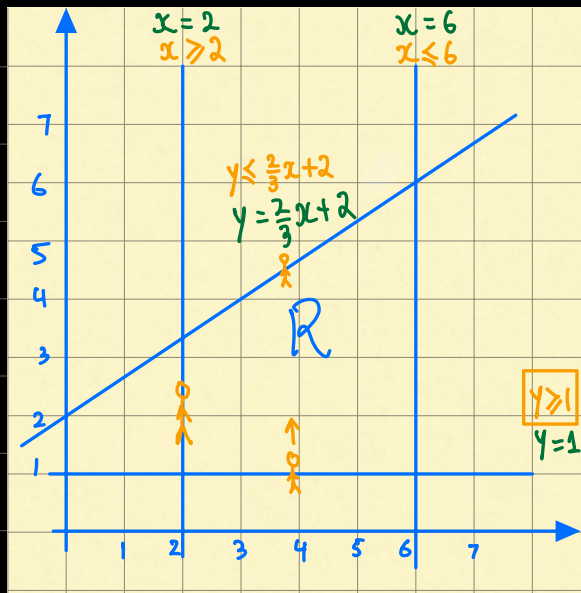
Right means  $>$

Left means  $<$

|             |                                                                                     |               |
|-------------|-------------------------------------------------------------------------------------|---------------|
| Solid line  |  | $\geq$ $\leq$ |
| Dotted line |  | $>$ $<$       |

## SHADING INEQUALITIES

(2-3 marks)



Region R is enclosed by 4 lines. Write down 3 inequalities that enclose region R. One inequality is  $y \geq 1$ .

Ans:

$$x \geq 2$$

$$x \leq 6$$

$$y \leq \frac{2}{3}x + 2$$

SLANT LINE:

$$y = mx + c$$

gradient (m) (0,2) (3,4)

$$m = \frac{4-2}{3-0} = \frac{2}{3}$$

$$y = \frac{2}{3}x + 2$$

y-int (c): check on graph  
 $c = 2$